

DYNAMIC EXPLORATION OF ELECTRONIC MAPS

BACKGROUND OF THE INVENTION

[0001] 1. Field of the Invention

[0002] This invention pertains in general to the visual representation of information and in particular to techniques for displaying information on electronic maps.

[0003] 2. Description of the Related Art

[0004] People use Internet-based electronic maps for a variety of purposes. Initial Internet-based map services allowed people to view street maps for cities and other geographic areas. People often used these services to obtain driving directions. More recent Internet-based services allow people to view more detailed maps. For example, people can now view satellite imagery, topographical data, and 3-D representations of buildings and other structures on maps. As a result, people now use Internet-based maps for many purposes other than for driving directions, such as for house and job hunting.

[0005] Even though there is a wide variety of map data available on the Internet, there are still many types of data that either cannot be viewed on maps, or are not well-represented on the maps. For example, a person hunting for a house might be interested in school districts, average housing prices, average incomes for a neighborhood, driving distances to work or shopping, etc. This information is often available on the Internet but cannot be viewed on a map.

[0006] If the data can be viewed on a map, the data are often displayed in a manner that reduces the effectiveness of the map. For example, one way to show school districts on a map is to present a static overlay that illustrates the district boundaries. Similarly, average housing prices can be shown by shading regions of the map with different colors representing the prices. A difficulty with representing data in this way is that the map quickly becomes cluttered with too much information and becomes difficult to comprehend.

[0007] Therefore, there is a need in the art for a way to display multiple types of data on a map without making the map difficult to comprehend.

BRIEF SUMMARY OF THE INVENTION

[0008] The above need is met by enabling interactive exploration of a dynamic map through the use of templates that display metrics using a variety of techniques. In one embodiment, a mapping engine displays an electronic map on a display device. The mapping engine includes a template module for receiving a template, the template specifying one or more metrics to display on the electronic map and specifying at least one computed metric that is generated from other metrics, a metric computation module for determining the computed metric specified by the template, and a rendering module for displaying the electronic map and the computed metric specified by the template on the display device.

[0009] In one embodiment, a system for enabling dynamic exploration of an interactive map comprises a metrics data storage module storing metrics describing mapped regions, a template storage module storing templates, each template identifying a set of metrics to display if the template is active, and a communications module receiving requests for

certain metrics and providing the metrics in response, and receiving requests for templates and providing the templates in response.

BRIEF DESCRIPTION OF THE DRAWINGS

[0010] FIG. 1 is a high-level block diagram of a computing environment for providing maps and related data according to one embodiment.

[0011] FIG. 2 is a high-level block diagram illustrating a functional view of a computer for use as one of the entities illustrated in the environment of FIG. 1 according to one embodiment.

[0012] FIG. 3 is a high-level block diagram illustrating modules within the metrics server according to one embodiment.

[0013] FIG. 4 is a high-level block diagram illustrating modules within the mapping engine according to one embodiment.

[0014] FIG. 5 shows an example of a display produced by the rendering module of the mapping engine according to one embodiment.

[0015] FIG. 6 is a flow chart illustrating steps performed by the mapping engine according to one embodiment.

[0016] The figures depict an embodiment of the present invention for purposes of illustration only. One skilled in the art will readily recognize from the following description that alternative embodiments of the structures and methods illustrated herein may be employed without departing from the principles of the invention described herein.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

I. Overview

[0017] FIG. 1 is a high-level block diagram of a computing environment 100 for providing maps and related data according to one embodiment. The illustrated environment contains a map server 110 and a metric server 112 coupled to a network 114. Multiple clients 116 having mapping engines 118 are also coupled to the network 114. Generally, the mapping engines 118 display maps from the map server 110 and metrics from the metrics server 112. The mapping engines 118 receive templates from the metrics server 112 and/or another entity that specify how to display certain metrics on the map. The templates and metrics are highly-customizable, which allows end-users to view metrics in a manner that maximizes comprehension of the map.

[0018] FIG. 1 and the other figures use like reference numerals to identify like elements. A letter after a reference numeral, such as “116A,” indicates that the text refers specifically to the element having that particular reference numeral. A reference numeral in the text without a following letter, such as “116,” refers to any or all of the elements in the figures bearing that reference numeral (e.g., “116” in the text refers to reference numerals “110A,” “110B,” and/or “110C” in the figures).

[0019] The map server 110 stores and provides data for generating maps. In one embodiment, the map data describe geographic regions, such as places on the Earth, Moon, or elsewhere in the solar system, and/or fictional locations. The map data include data such as geographic and political boundaries, topographical data, image data (e.g., satellite imagery), street and address data, data describing geographic features and buildings, and/or other types of data. In